



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/807,472

03/24/2004

Osamu Nakamura

740756-2722

2927

22204

7590

11/07/2008

NIXON PEABODY, LLP

401 9TH STREET, NW

SUITE 900

WASHINGTON, DC 20004-2128

EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

11/07/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/807,472	Applicant(s) NAKAMURA, OSAMU	
	Examiner RAKESH K. DHINGRA	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 10-31, 33-38 and 40-56 is/are pending in the application.
- 4a) Of the above claim(s) 24-31, 33-38, 40-44, 48-50 and 54-56 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 10-23, 45-47 and 51-53 is/are rejected.
- 7) ☒ Claim(s) 38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 2/14/06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>04/08</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election of species 1 (Fig. 1) with claims 1-4, 10-23, 45-47, 51-53 in the reply filed on 8/8/08 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 24-31, 33-38, 40-44, 48-50 and 54-56 are withdrawn from consideration.

Claims listing

Per CFR 1.121 - Amendments to a claim must be made by rewriting the entire claim with all changes (e.g., additions and deletions) as indicated in this subsection, except when the claim is being canceled. Each amendment document that includes a change to an existing claim, cancellation of an existing claim or addition of a new claim, must include a complete listing of all claims ever presented, including the text of all pending and withdrawn claims, in the application. The claim listing, including the text of the claims, in the amendment document will serve to replace all prior versions of the claims, in the application. In the claim listing, the status of every claim must be indicated after its claim number by using one of the following identifiers in a parenthetical expression: (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

In this case, status of claims 1-3, 19, 24, 29, 31, 36, 38 and 43 which had been amended in the applicant's claim list dt. 4/7/08 has now been changed to "Previously Presented" in the current claim list (dt. 8/8/08), even though no office action was taken on these claims. For the purpose of clarity of record, the identifiers of these claims in the claim list should be "Amended" or "Withdrawn - Amended" (as relevant).

Response to Arguments

Applicant's arguments with respect to claims 1-44 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Applicant has amended claims 1-3, 19, 24, 29, 31, 36, 38 and 43 by adding new limitations like in claim 1, new limitation "wherein the first electrode and the plurality of second electrodes are arranged perpendicular to a subject substrate" has been added. Further applicant has cancelled claims 5-9, 32 and added new claims 45-56.

Accordingly claims 1-4, 10-31, 33-38 and 40-56 are now pending out of which claims 1-4, 10-23, 45-47 and 51-53 are active.

New reference by Amato-Wierda et al (US 2003/0104141) when combined with Gianchandani et al reads on limitations of amended claim 1. Accordingly claims 1, 10, 13, 16, 19, 22, 45 and 51 have been rejected under 35 USC 103 (a) as explained below. Balance claims 2, 3, 11, 12, 14, 15, 17, 18, 20, 21, 23, 46, 47, 52, 53 have also been rejected under 35 USC 103 (a) as explained below. Applicant's argument that Gianchandani does not teach blowing a process gas into a space between the first and plurality of second electrodes is moot in view of new reference by Amato-Wierda et al that teaches gas 62 blown between first and second electrodes 54, 56 respectively.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

Art Unit: 1792

matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 10, 13, 16, 19, 22, 45 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amato-Wierda et al (US 2003/0104141) in view of Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870, and referred to hereinafter).

Regarding Claim 1: Amato-Wierda et al teach a plasma apparatus comprising:

a plasma generation unit comprising a first electrode 54 and a second electrode 56 opposed to the first electrode;

a gas supply unit adapted to blow a process gas 60, 62 into a space 57 between the first electrode 54 and the second electrode 56; and

a power supply unit 64 adapted to apply a voltage to at least one of the electrodes 54, 56, and

wherein the first electrode and the second electrode are arranged perpendicular to a subject substrate 52 (e.g. Fig. 5 and para. 0026-0032).

Amato-Wierda et al do not teach the second electrode is a plurality of second electrodes; the gas supply unit blows process gas between the first electrode and the plurality of second electrodes; the power supply unit is adapted to selectively apply a voltage to at least one electrode among the plurality of second electrodes; and wherein the plurality of second electrodes are arranged linearly in one line, and wherein the first electrode and the plurality of second electrode are arranged perpendicular to a subject substrate.

Gianchandani et al teach a plasma apparatus comprising:

a plasma generation unit comprising a substrate 17 (as a first electrode) and a plurality of electrode elements 51, 52 opposed to the first electrode 17; and

a gas supply unit 13 for blowing (introducing) a process gas into a space between the first electrode 17 and the plurality of second electrodes 51, 52 such that a plurality of micro plasma with independent control can be generated {the plasma is generated between the electrode segments and the substrate 17 due to dissociation of gas blown in these openings and by the voltage applied from a power supply}. Gianchandani et al also teach that ingress of gas in the openings 24 (space between first and second electrodes 26, 17) can be obtained through laterally extending micro-channels (not shown) in the dielectric layer 22 [that is gas is blown in a space between the first electrode and the plurality of second electrodes]; and.

a power supply unit 31 for applying a voltage independently (selectively) to at least one electrode among the plurality of second electrodes 51 and 52, wherein the plurality of second electrodes 51, 52 of the plasma generation unit are arranged linearly in one line (for example, Fig. 1-3 and col. 2, lines 40-65 and col. 5, line 25 to col. 7, line 35). It would be obvious to provide plurality of second electrodes that can be supplied with independently controlled power in the apparatus of Amato-Wierda et al to obtain plurality of independently controlled micro plasmas that enable highly controlled plasma processing.

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to provide to provide plurality of second electrodes that can be supplied with independently controlled power as taught by Gianchandani et al in the apparatus of Amato-Wierda et al to obtain plurality of independently controlled micro plasmas that enable highly controlled plasma processing.

Regarding Claim 10: Gianchandani et al teach that plurality of second electrodes are formed using lithography techniques (Fig. 5 and col. 10, lines 15-25).

Regarding Claim 13: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 are covered with dielectric 22 (Fig. 1).

Regarding Claim 16: Gianchandani et al teach the apparatus is used for etching or deposition (col. 2, lines 50-60).

Regarding Claim 19: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least one electrode (can be pre-determined electrode since voltage can be supplied independently to various electrodes) [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35].

Regarding Claim 22: Gianchandani et al teach that typical operating pressure can range from 1-1000 torr (as against claimed pressure of 1 atm = 760 torr). It would be obvious to select operating pressure as other process limitations like gases, material to be etched /deposited and voltages etc (col. 8, lines 5-15).

Regarding Claim 45: Amato-Wierda et al teach the blown process gas 62 acts on the substrate 52 (Fig. 5).

Regarding Claim 51: Amato-Wierda et al in view of Gianchandani et al teach all limitations of the claim including movable electrodes 51, 52 (through stage 56) that enable moving the electrodes with respect to substrate to provide selective plasma processing on the substrate surface. Though Gianchandani et al do not explicitly teach movement in both X-Y directions it would be obvious to do the same in view of teaching of Gianchandani et al to obtain selective processing of substrate at any location on the substrate.

Claims 2, 3, 11, 12, 14, 15, 17, 18, 20, 21, 23, 46, 47, 52, 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amato-Wierda et al (US 2003/0104141) in view of Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870, and referred to hereinafter) and Morfill et al (US 6,777,880).

Regarding Claims 2, 3: Amato-Wierda et al in view of Gianchandani et al teach all limitations of the claim including the first and the plurality of second electrodes arranged perpendicular to a substrate (as explained above under claim 1) and further teach plasma apparatus (Figures 1-3)

Amato-Wierda et al in view of Gianchandani et al further teach (Figure 8) that size and spacing of electrodes may be selected as per type of treatment required like anisotropic etch or isotropic etch etc (column 7, lines 15-30 and column 12, lines 5-30), but do not explicitly teach specific size of second electrode.

Morfill et al teach a plasma apparatus (Figures 1-6) comprising a segment electrode 11 with electrode segments 113 and a second electrode 112. Morfill et al further teach grid size of segmented electrode to be 1.27mm (as against claim size of 1 mm). Morfill et al also teach that size and spacing of electrode segments is application dependent (col. 9, lines 10-68).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select size of second electrodes as taught by Morfill et al in the apparatus of Amato-Wierda et al in view of Gianchandani et al as per type of process treatment required.

Regarding Claim 4: Gianchandani et al teach all limitations of the claim except pattern is a wiring pattern, which is an intended use. Since the prior art apparatus meets all structural

Art Unit: 1792

limitations of the claim, the apparatus is considered capable of meeting this intended use limitation.

In this connection courts have ruled:

A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Regarding Claims 11, 12: Gianchandani et al teach plurality of second electrodes are formed using lithography techniques (Fig. 5 and col. 10, lines 15-25).

Regarding Claims 14, 15: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 covered with dielectric 22 (Fig. 1).

Regarding Claim 17: Gianchandani et al teach the apparatus is used for etching or deposition (col. 2, lines 50-60).

Regarding Claims 18, 23: Gianchandani et al teach that typical operating pressure can range from 1-1000 torr (as against claimed pressure of 1 atm = 760 torr). It would be obvious to select operating pressure as other process limitations like gases, material to be etched /deposited and voltages etc (col. 8, lines 5-15).

Regarding Claims 20, 21: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least on electrode [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35].

Regarding Claims 46, 47: Amato-Wierda et al teach the blown process gas 62 acts on the substrate 52 (Fig. 5).

Regarding Claims 52, 53: Amato-Wierda et al in view of Gianchandani et al teach all limitations of the claim including movable electrodes 51, 52 (through stage 56) that enable moving the electrodes with respect to substrate to provide selective plasma processing on the substrate surface. Though Gianchandani et al do not explicitly teach movement in both X-Y direction it would be obvious to do the same in view of teaching of Gianchandani et al to obtain selective processing at any location on the substrate.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAKESH K. DHINGRA whose telephone number is (571)272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Rakesh K Dhingra/
Examiner, Art Unit 1792

/K. M./
Primary Examiner, Art Unit 1792